

FIGURE 1A

Predicted Responses/Treatment Non-Predictive Patient Data/Symptoms Predictive Database Web Based Server Symptom Profiler Symptoms Clinical Database Treatment Recommendations and Predicted Responses ZHWŒZWH Patients Data Thin Client (PC Based) User

FIGURE 1B

The activation is passed through a function to produce an output O((t)=f(a(t))At each point in time each unit has an activation value a(t)The weight determines the strength of the effect ≥

FIGURE 1C

Individual Patient Recovery Profile Monitor Recovery Phase Pattern Predictor Treatment Selection Treatment Slection Phase Outcome Predictor (Multiple treatments) Baseline Diagnostic Information Diagnosis Criteria

FIGURE 2

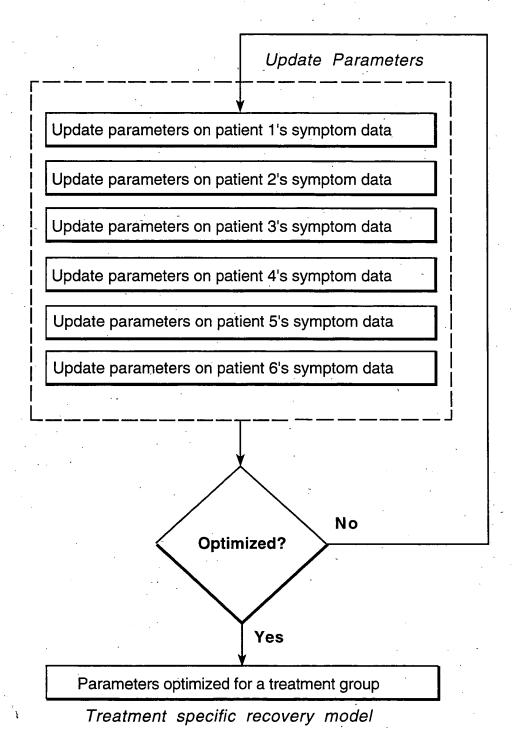


FIG. 3-3

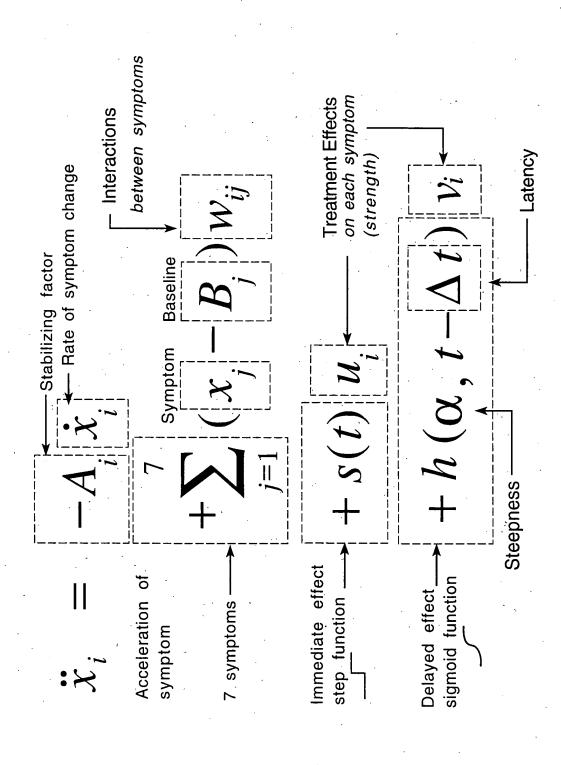
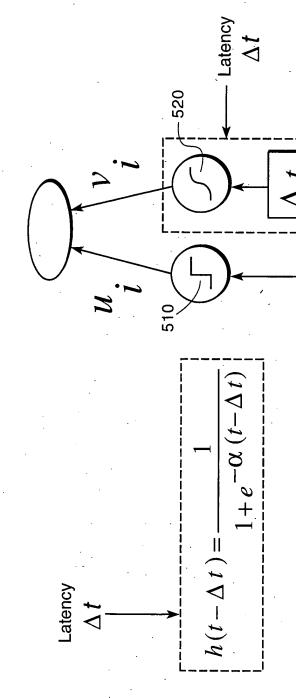


FIG. 3-5



 α Rapidness of response

 Δt Latency

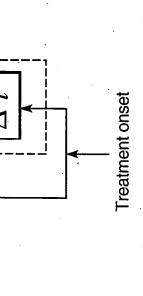
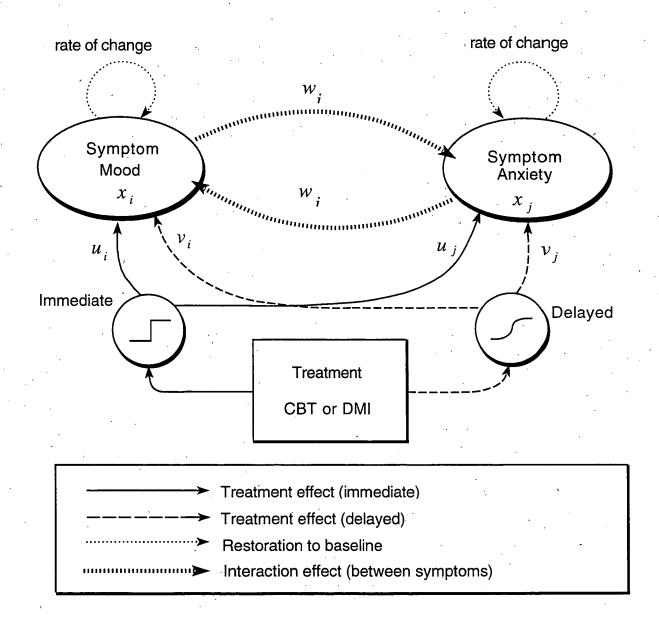
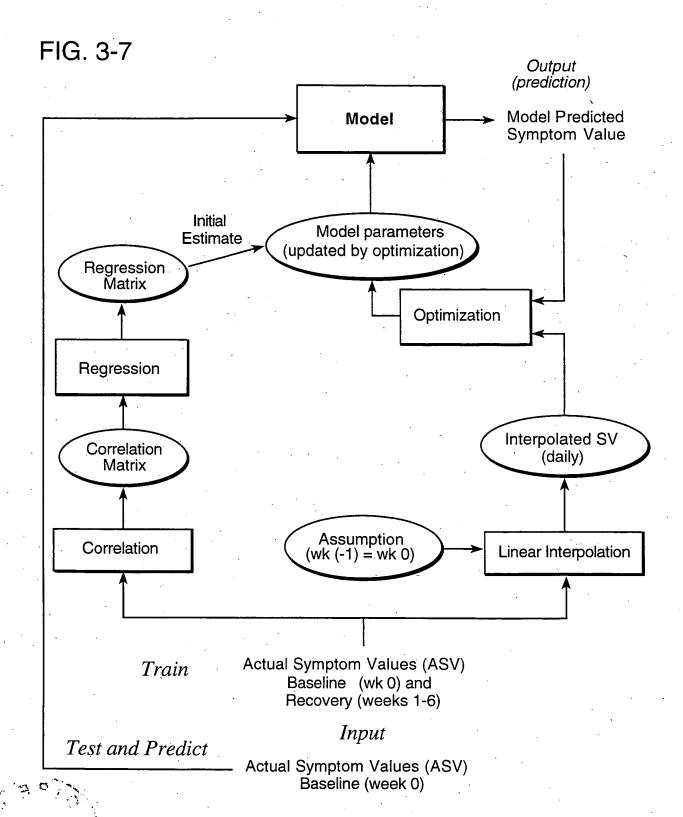
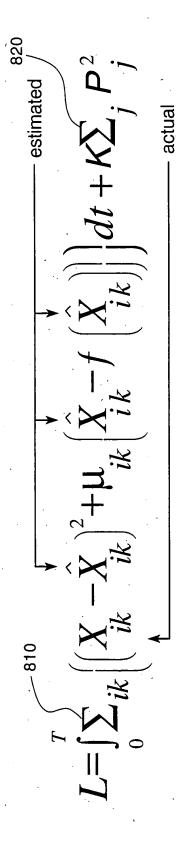


FIG. 3-6







Obtain optimized parameters

Error term

- fit patient data
- train on entire recovery period
- minimize error term L

symptoms parameter

data

|| || ||

patients

k =

- gradient descent on parameters

FIG. 3-9A

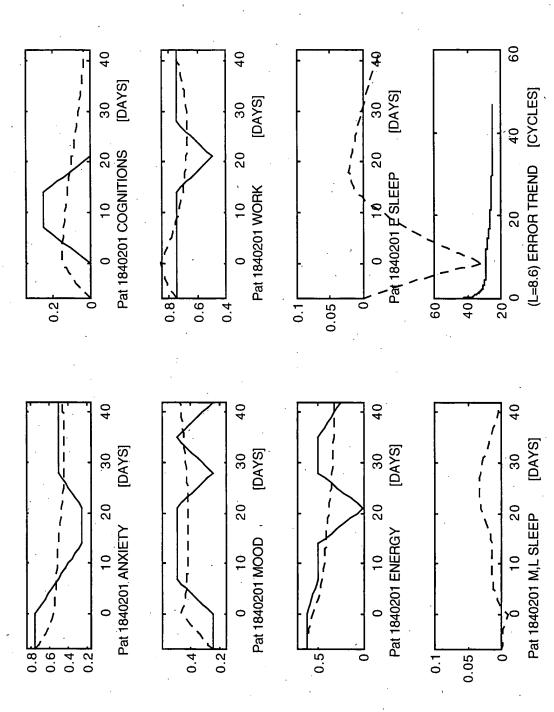


FIG. 3-9B

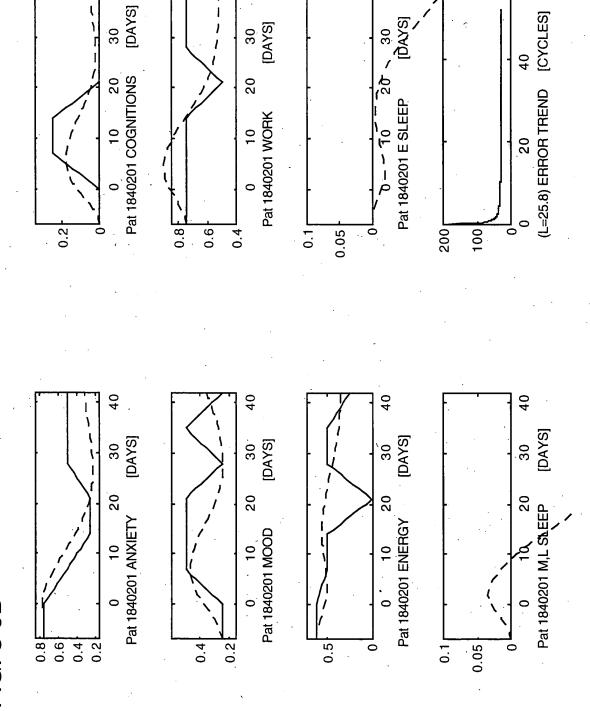
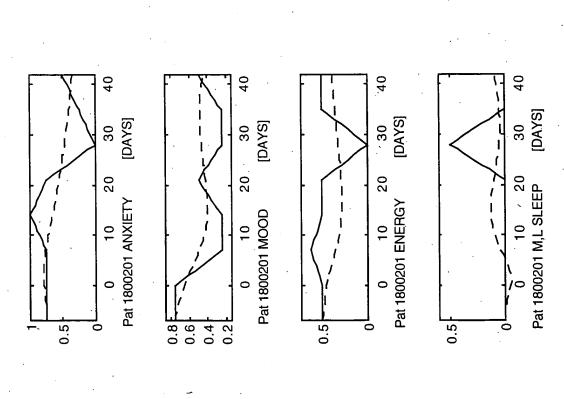


FIG. 3-10A



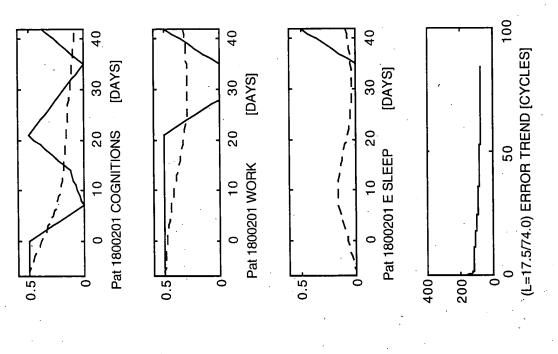
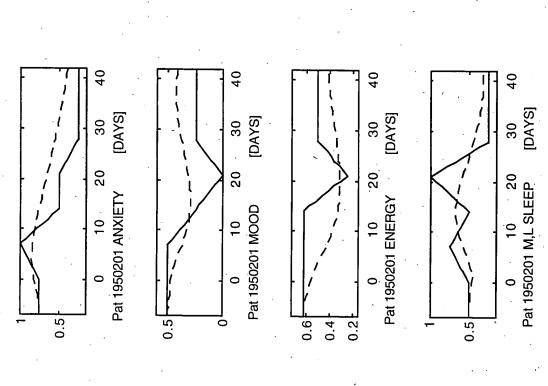


FIG. 3-10B



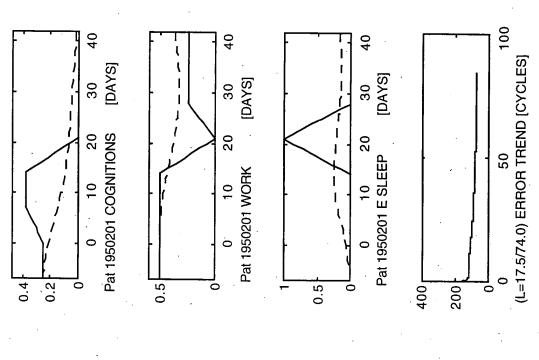
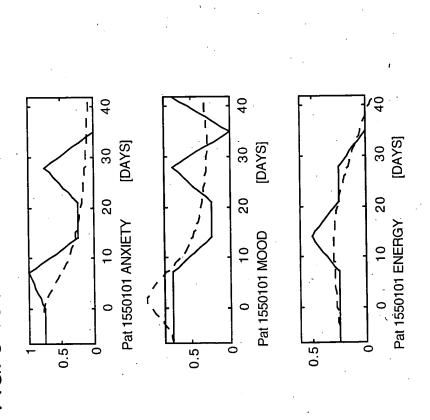
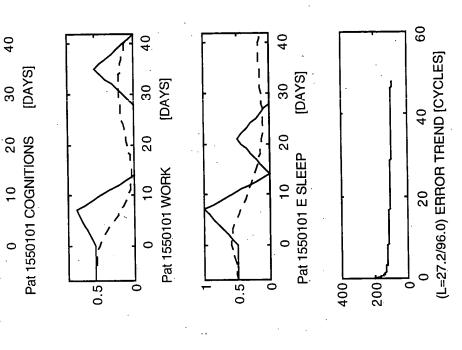


FIG. 3-10C



0.0000 0.4601-

30 [DAYS]



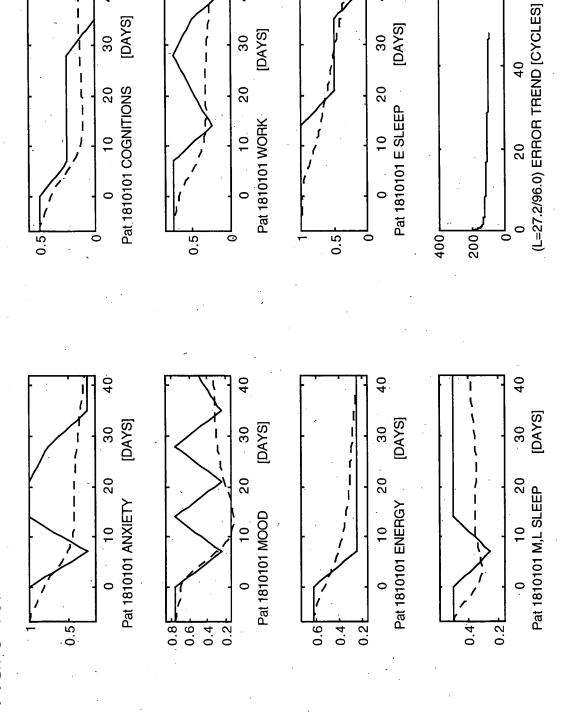
40

30 (EDAYS)

0 10 20 Pat 1550101 M,L SLEEP

0.5

FIG. 3-10D



[DAYS]

[DAYS]

[DAYS]

0 100 200 (L=3.1) ERROR TREND 0 10 2 Pat 0 COGNITIONS Pat 0 E SLEEP 0 10 Pat 0 WORK 10 0.3 0.6 0.2 0.4 100 0.2 0.4 0.5 0 30 [DAYS] 30 30 [DAYS] [DAYS] 20 3 [DAYS] 20 0 10 2 Pat 0 M,L SLEEP 0 10 Pat 0 ANXIETY 0 10 Pat 0 ENERGY 0 10 Pat 0 MOOD FIG. 3-11A 0.8년 0.6 0.6 0.4 9.0 0.4

[DAYS]

20

40

) 30 [DAYS]

400

300 [CYCLES]

40

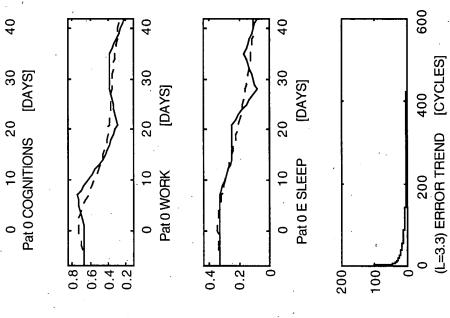
30

20

[DAYS]

20 [DAYS] [DAYS] 20 30 [DAYS] 20 0 10 Pat 0 ANXIETY 0 10 Pat 0 MOOD Pat 0 ENERGY 10 FIG. 3-11B 0.6E 0.4 0.4 0.2

0.2



40

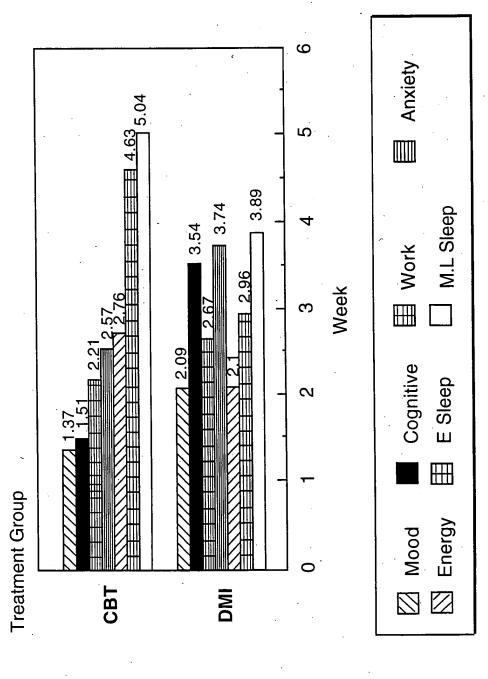
20 30 [DAYS]

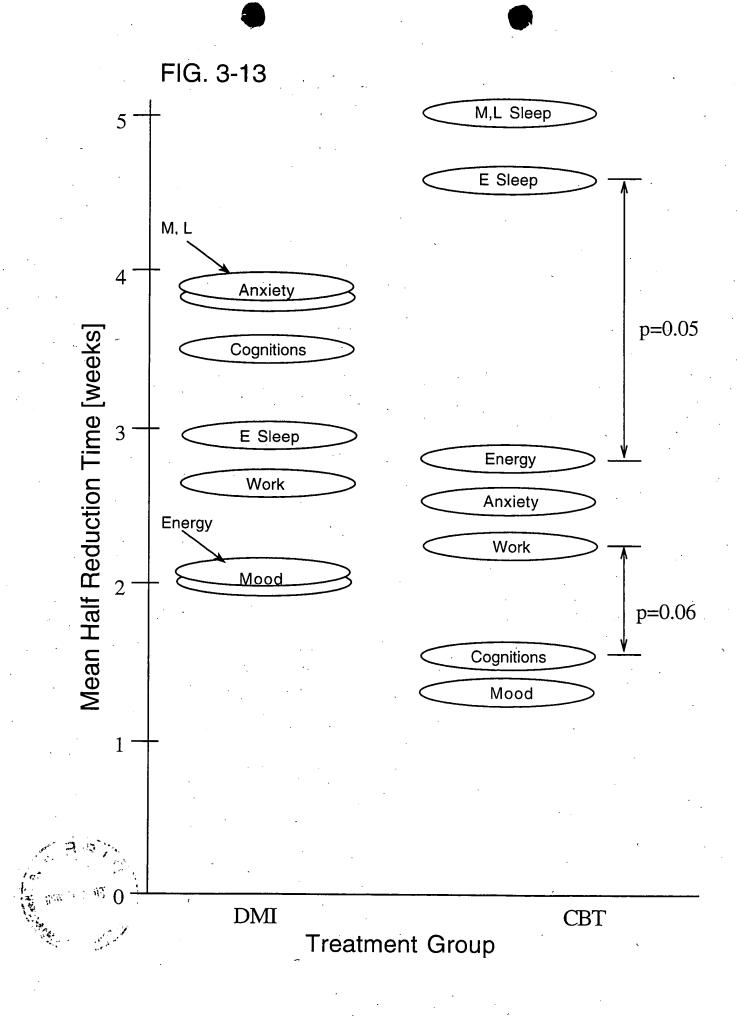
0 10 2 Pat 0 M,L SLEEP

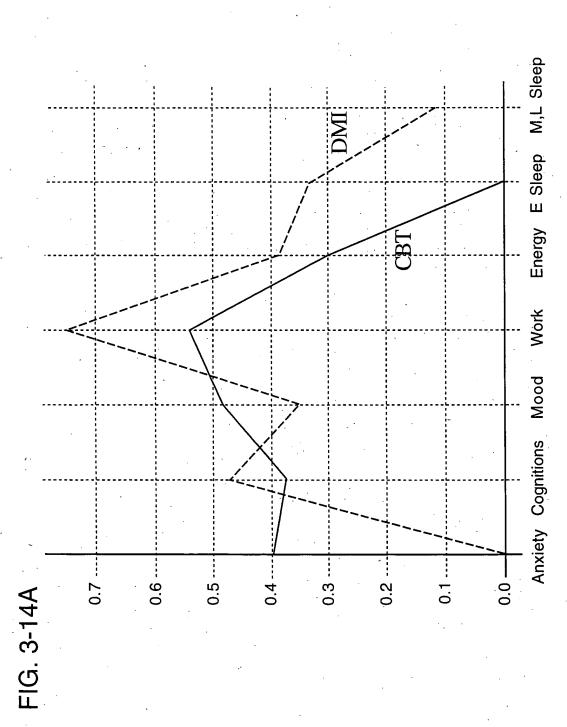
0.4 0.2 20

FIG. 3-12

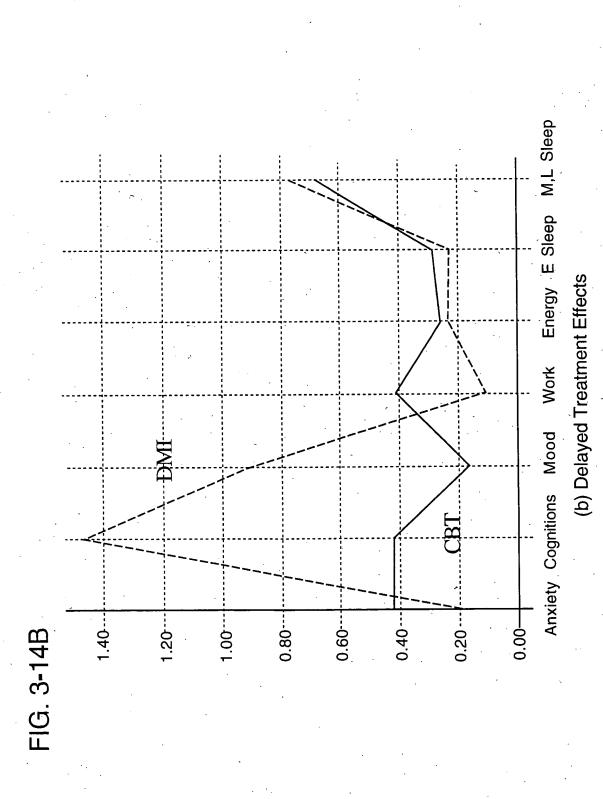
Mean Half Reduction Time

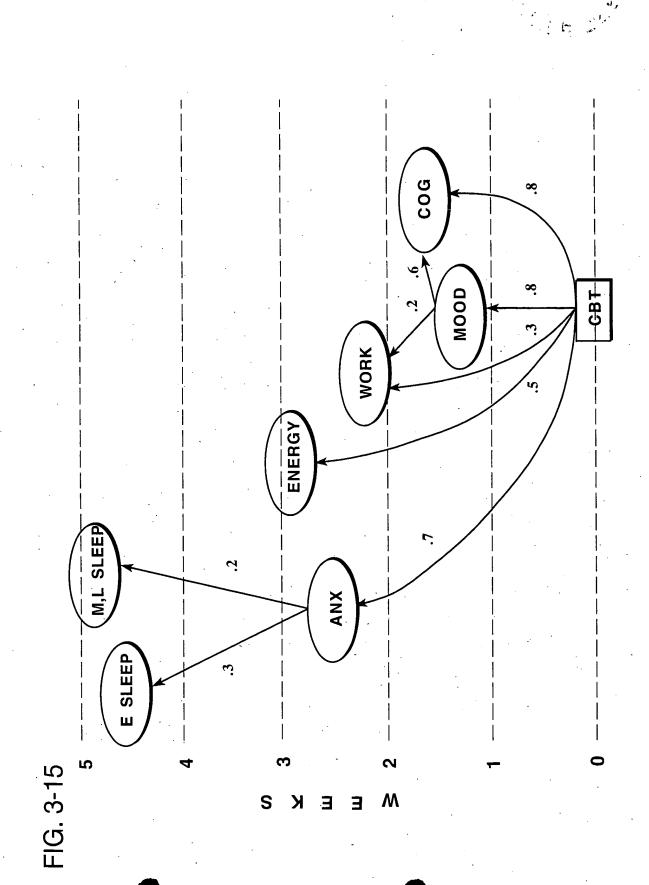






(a) Immediate Treatment Effects





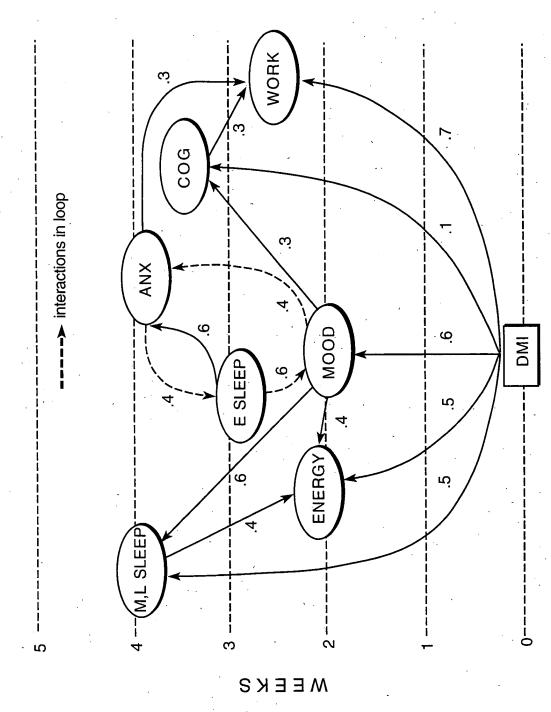
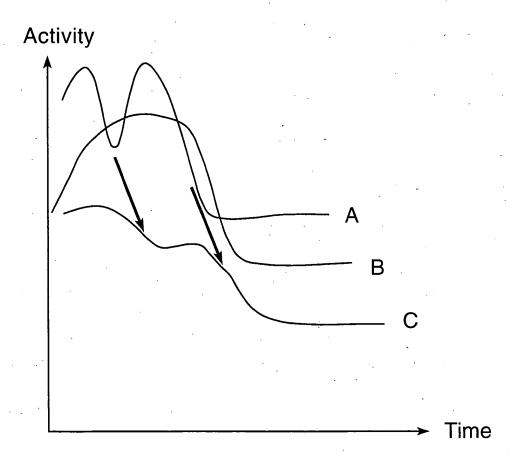
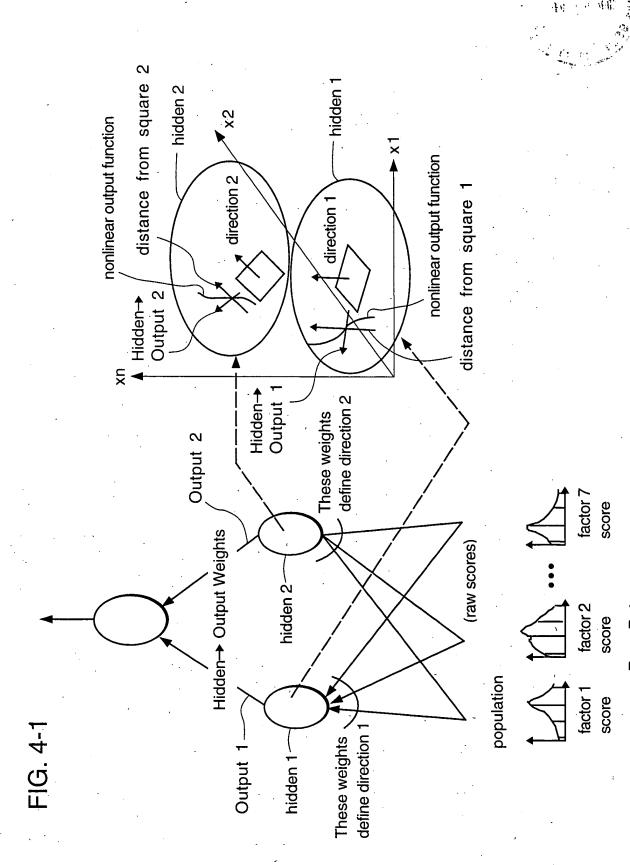


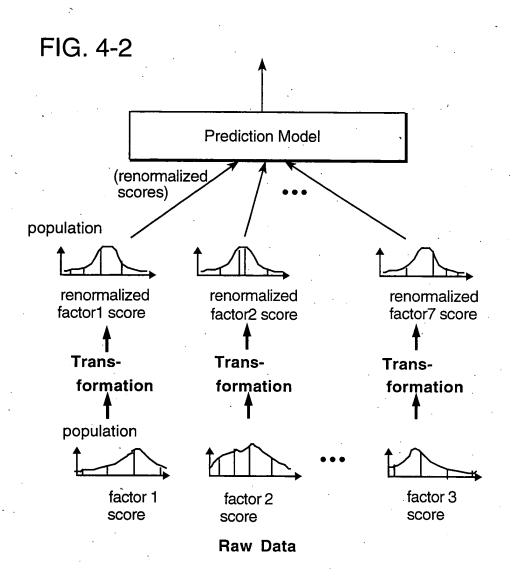
FIG. 3-16

FIG. 3-17





Raw Data



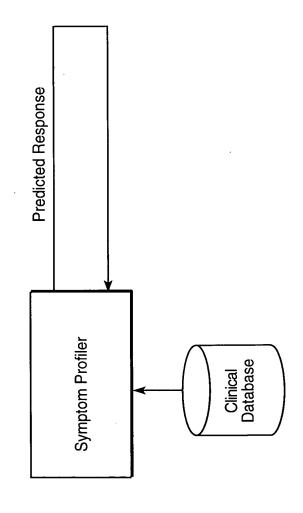


FIGURE 1A

FIGURE 1B

Table 4.1

Prediction of Outcome from Baseline Symptoms														
Symptom	Treatment													
HDRS Item	Other	er Tricyclic							MA	OI	SSRI	Psycho- therapy		ECT
		Ami	Nor	IMI	DMI	Clo	Lev	Мар	Phe	Tran	Flu	IPT	CBT	ECT
Severity	5 <u>,9</u>	<u>10-</u>		<u>10-</u> ,11 <u>,16</u> + <u>,17+</u>	1,8	8,13	<u>3</u> _	<u>3–,6</u> 1	<u>17+</u>		1	<u>16+</u>	7	14-
Depressed Mood	2	<u>10-</u> 15	4	<u>10–</u> ,11	1,8	8			4	<u>18+</u>	1			14-
Feelings of Guilt		15		11	1,8	8				. 18	1			14
Suicide	5	15		.11	1,8	8				18	1			14
Insomnia: early	2	15	4	11	1,8	8			12,4	18	1			14
Insomnia: middle	2	<u>15-</u>	4	11	1,8	8			12,4	<u>18-</u>	1			14
Insomnia: late	2	15	4	11 <u>,12+</u>	1,8	8		,	4	<u> 18-</u>	1			14
Work and Interests		15	4	11,12	1,8	8			11	18	1			14-
Retardation	2	10, 15	4	10,11 <u>,12+</u>	1,8	8			4	<u>18+</u>	1			18
Agitation	. 2	10, 15		10,11,12	1,8	8			12,4	18	1			14-
Anxiety : somatic	2	10,15	4	10, 11	1,8	8			4	18	. 1			
Anxiety : psychic	2	10,15	4	10, 11	1,8	8			4	18	1			
Somatic: gastrointestinal		<u>15-</u>		11	1,8	8				18	1	`		14-
Somatic: general		10, 15	4	10, 11	1,8	8			4	18	1			
Genital symptoms		15		11, 12	1,8	8			11	18	1	į,		14
Hypochondriasis		<u>15-</u>	4	11	1,8	8	4.		4	18	1			14
Loss of Weight (or change)	2	15	4	11, 12	1,8	8			12,4	<u>18+</u>	1			14
Insight	. *	<u>15+</u>		11	1,8	8				18	1			
Diurnal variation		15	4	11, 12	1,8	8			12,16	18	1			14
Depersonaliztion and derealization		15		11	1,8	8				18	1			
Paranoid symptoms	2	15		- 11	1,8	8				18	1			
Obsessive and compulsive	2	15		.11	1,8	8				18	1			

Table 4.2

- 1. Bowden, C., Schatzberg, A., Rosenbaum, A., Contreras, S., Samson, J., & Dessain, E. (1993). Fluoxetine and desipramine in major depressive disorder. Journal of Clinical Psychopharmacology, 13, 305-311.
- 2. Carney, M., Reynolds, E., & Sheffield, B. (1986). Prediction of outcome in depressive illnesses by the Newcastle diagnosis scale: Its relationship to with the unipolar/bipolar and DSM-III systems. British Journal of Psychiatry.
- 3. Filip, V., Hoschl, C., Karen, P., Seifertova, D., Bornova, L., Praskova, H., & Prasko, J. (1993). Predicting therapeutic results with levoprotiline and maprotiline in major depression: The role of the outcome criteria. British Journal of Psychiatry, 163, 35-38.
- 4. Georgotas, A. & McCue, R. E., Cooper, T., Chang, I., Mir, P., & Welkowitz, J. (1987). Clinical Predictors of Response to Antidepressants in Elderly Patients. Biological Psychiatry, 22, 733-740.
- 5. Hinrichsen, G. A. & Hernandez, N. A. (1993). Factors associated with recovery from and relapse into major depressive disorder in the elderly. American Journal of Psychiatry, 150, 1820-18 25.
- 6. Hoencamp, E., Haffmans, P. M. J., Duivenwoorden, H., knegtering, H., & Dijken, W. A. (1994). Predictors of (non-)response in depressed outpatients treated with a three-phase sequential mediation strategy. Journal of Affective Disorders, 31, 235-246.
- 7. Johnson, S. L., Monroe, S., Simons, A., & Thase, M. E. (1994). Clinical characteristics associated with interpersonal depression: symptoms, course, and treatment response. Journal of Affective Disorders, 31, 97-109.
- 8. Joyce, P. R., Mulder, R. T., & Cloninger, C. R. (1994). Temperament predicts clomipramine and desipramine response in major depression. Journal of Affective Disorders, 30, 35-46.
- 9. Katon, W., Lin, E., Von Korff, M., Bush, T., Walker, E., Simon, G., & Robinson, P. (1994). The predictors of depression in primary care. Journal of Affective Disorders, 31, 81-90.
- 10. Katz, M., Koslow, S., Maas, J., Frazer, A., Bowden, C., Casper, R., Croughan, J., Kocsis, J., & Redmond Jr., E. (1987). The timing, specificity, and clinical predictors of tricyclic drug effects in depression. Psychological Medicine, 17, 297-309.
- 11. Kocsis, J. H., Mason, B. J., Frances, A. J., Sweeney, J., Mann, J. J., & Marin, D. (1989). Prediction of response of chronic depression to imipramine. Journal of Affective Disorders, 17, 225-260.
- 12. McGrath, P. J., Stewart, J. W., Harrison, W. M., Ocepek-Welikson, K., Rabkin, J. G., Nunes, E. N., Wagner, S. G., Tricamo, E., Quitkin, F. M., & Klein, D. F. (1992). Predictive value of symptoms of atypical depression for differential treatment outcome. Journal of Clinical Psycho pharmacology, 12, 197-202.
- 13. Nagayama, H., Nagano, K., Ikezaki, A., & Tashiro, T. (1991). Prediction of efficacy of antidepressant by 1-week test therapy in depression. Journal of Affective Disorders, 23, 213-216.
- 14. Pande, A., Krugler, T., Haskett, R., Greden, J., & Grunhaus, L. (1988). Predictors of response to electroconvulsive therapy in major depressive disorder. Biological Psychiatry, 24, 91-93.
- 15. Sauer, H., Kick, H., Minne, H. W., & Schneider, B. (1986). Prediction of the amitriptyline response: Psychopathology versus neuroendocrinology. International Clinical Psychopharmacology, 1, 284-295.
- 16. Sotsky, S. M., Glass, D. R., Shea, T. M., Pilkonis, P. A., Collins, J. F., Elkin, I., Watkins, J. T., Imber, S. D., Leber, W. R., Moyer, J., & Oliveri, M. E. (1991). Patient predictors of response to psychotherapy and pharmacotherapy: Findings in the NIMH treatment of depression collaborative research program. American Journal of Psychiatry, 148, 997-1008.
- 17. Vallejo, J., Gasto, C., Catalan, R., Bulbena, A., & Menchon, J. (1991). Predictors of antidepressant treatment outcome in melancholia: psychosocial, clinical, and biological indicators. Journal of Affective Disorders, 21, 151-162.
- 18. White, K. & White, J. (1986). Tranylcypromine: Patterns and predictors of response. Journal of Clinical Psychiatry, 47, 380-382.

The activation is passed through a function to produce an output At each point in time each unit has an activation value a(t) The weight determines the strength of the effect ≥

FIGURE 1C

Individual Patient Recovery Profile Monitor Recovery Phase Pattem Predictor Treatment Selection Treatment Slection Phase Outcome Predictor (Multiple treatments) Baseline Diagnostic Information Diagnosis Criteria

FIGURE 2

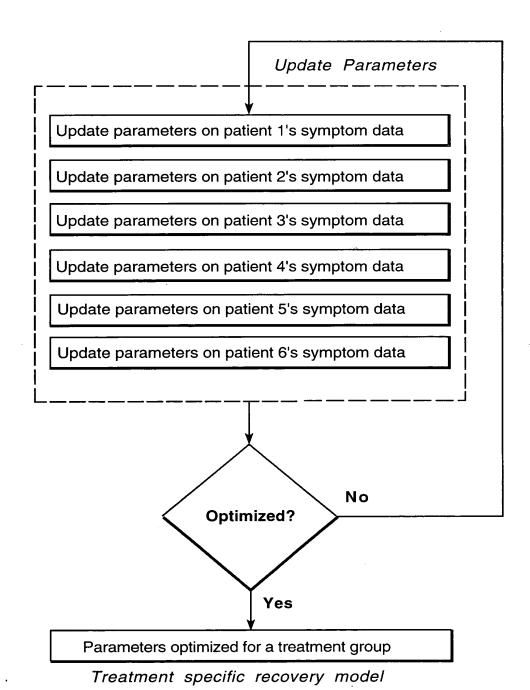


FIG. 3-3

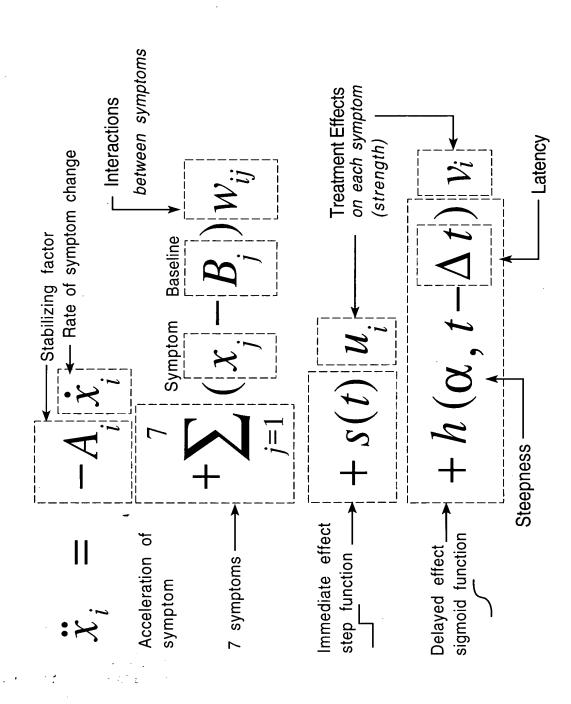


FIG. 3-5

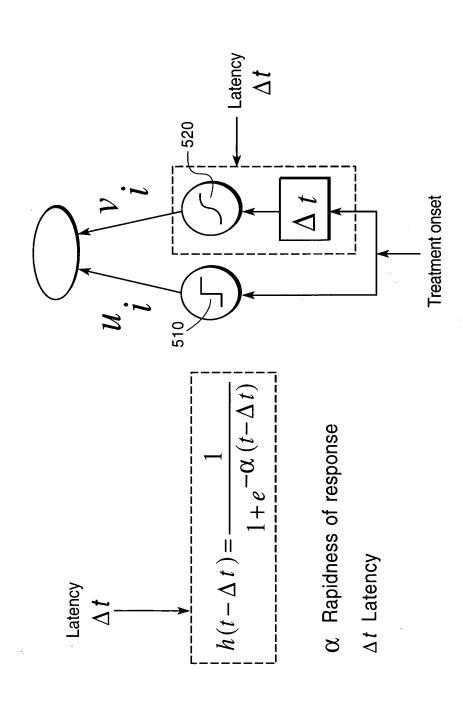
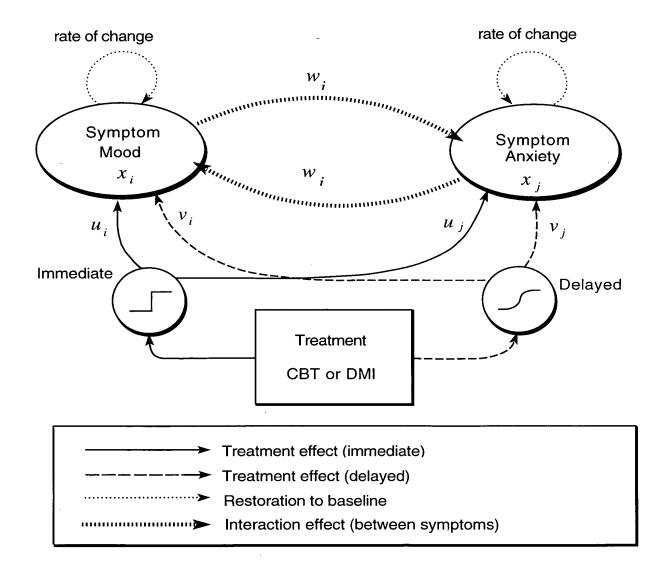
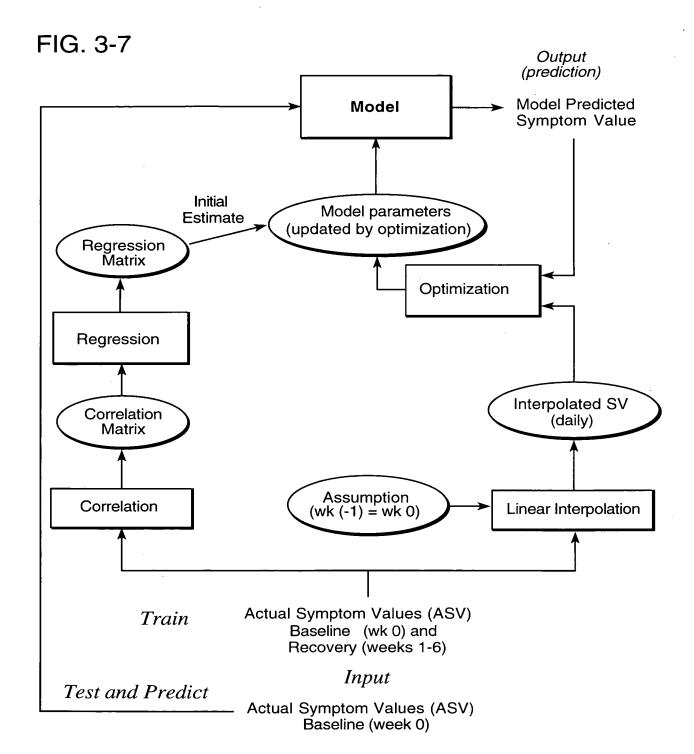
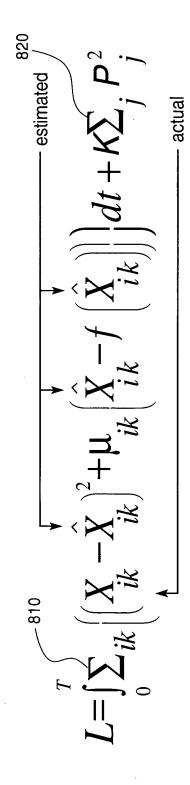


FIG. 3-6







Obtain optimized parameters

- fit patient data
- train on entire recovery period
- minimize error term L

symptoms

patients

| <u>|</u>

parameter

data

- gradient descent on parameters

Error term

T = T

FIG. 3-9A

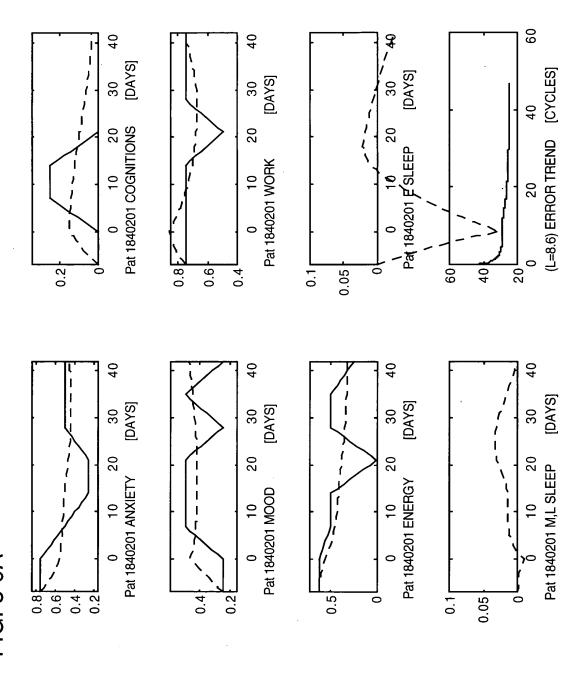


FIG. 3-9B

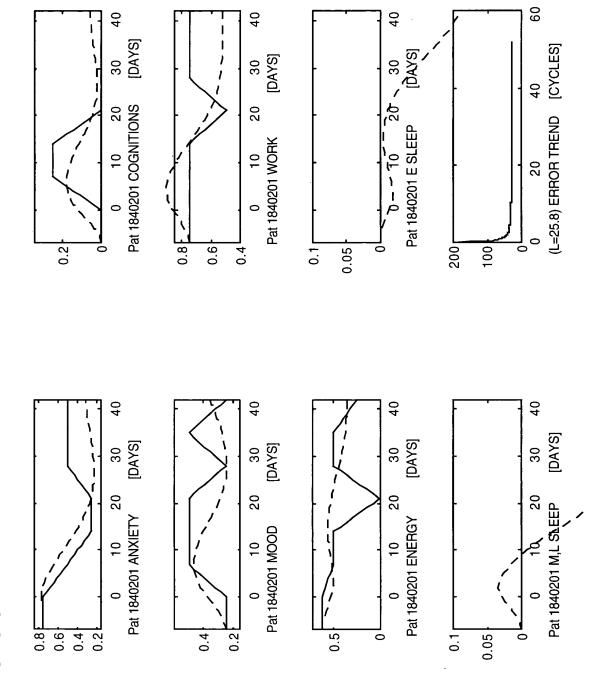
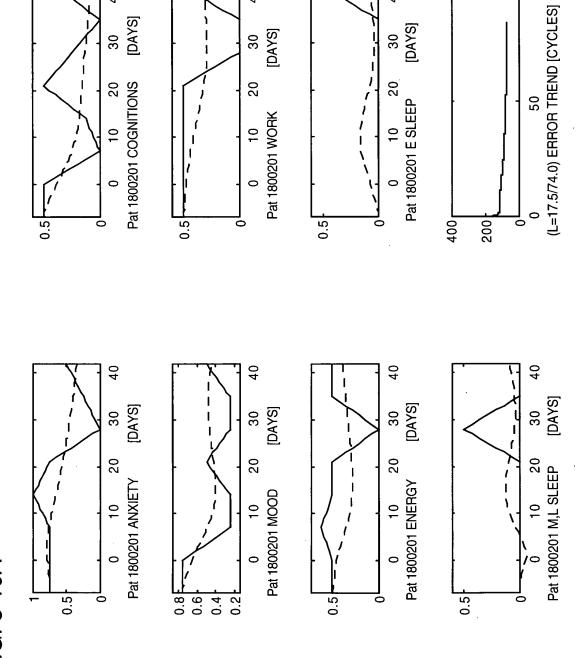


FIG. 3-10A



Pat 1950201 MOOD [DAYS]

0.5

0.5

0.5

0.6

0.6

0.7

0.6

0.7

0.8

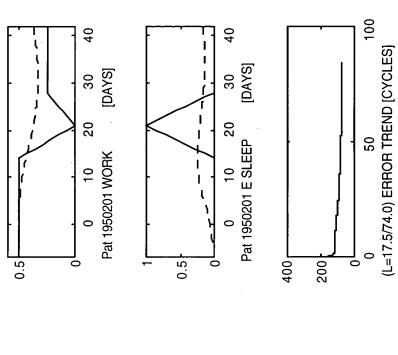
0.9

0.9

Pat 1950201 ENERGY [DAYS]

30 [DAYS]

0.2



30 [DAYS]

0 10 20 Pat 1950201 M,L SLEEP

0.5

FIG. 3-10C

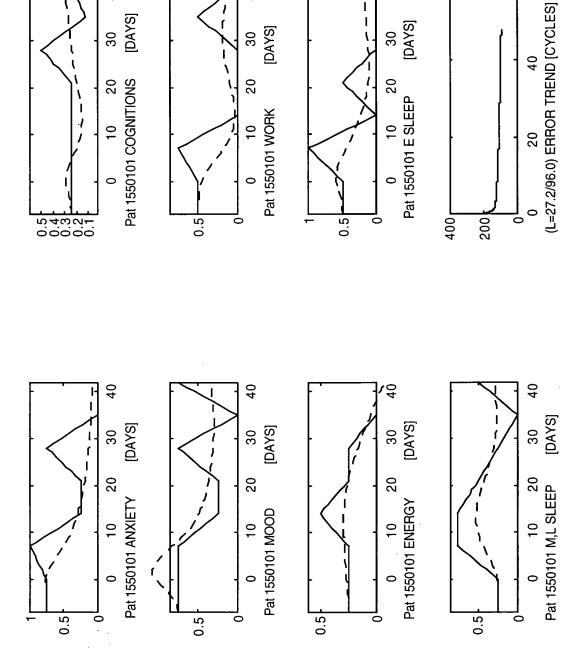
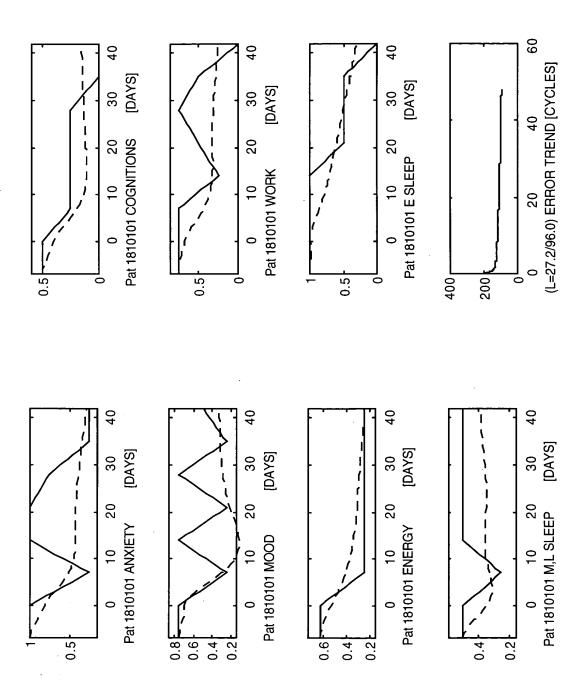


FIG. 3-10D



0 100 200 300 (L=3.1) EHROR TREND [CYCLES] 30 [DAYS] 30 [DAYS] [DAYS] 0 10 20 Pat 0 COGNITIONS 0 10 Pat 0 E SLEEP 0 10 Pat 0 WORK 0.2 0.6 0.2 0.4 0.2 200 r 100 0.4 30 30 30 0 10 20 30 Pat 0 M,L SLEEP [DAYS] [DAYS] [DAYS] [DAYS] 20 20 0 10 Pat 0 ANXIETY 0 10 Pat 0 ENERGY 0 10 Pat 0 MOOD FIG. 3-11A 0.8 0.6 0.6E 0.2 9.0 0.4 0.4 0.2 0.4

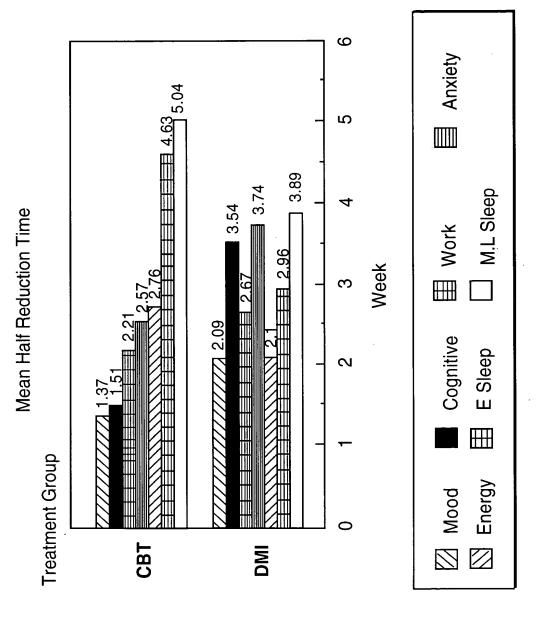
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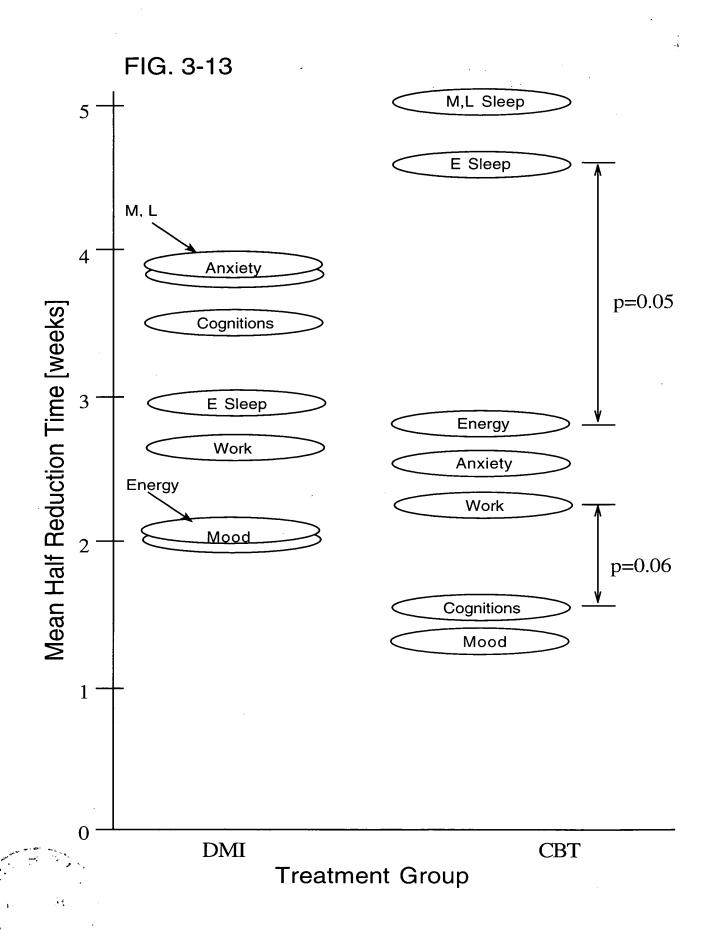
400

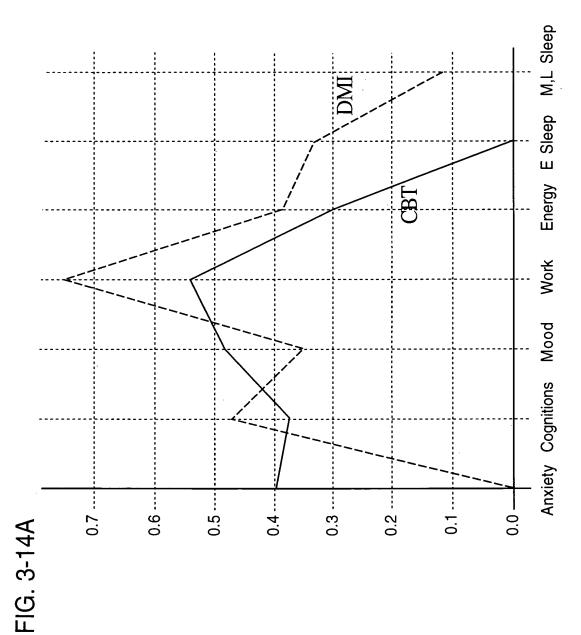
0 200 400 (L=3.3) ERROR TREND [CYCLES] 0 10 20 30 Pat 0 COGNITIONS [DAYS] [DAYS] [DAYS] 0 10 Pat 0 E SLEEP 0 10 Pat 0 WORK 0.8 0.6 0.4 0.2 0.4 0.2 100 0.4 0.2 40 0 10 20 30 Pat 0 M,L SLEEP [DAYS] [DAYS] [DAYS] [DAYS] 20 0 10 Pat 0 ANXIETY 0 10 Pat 0 ENERGY 0 10 Pat 0 MOOD FIG. 3-11B 0.6 0.2 0.4 0.5 0.4 0.2 0.4 0.2

900

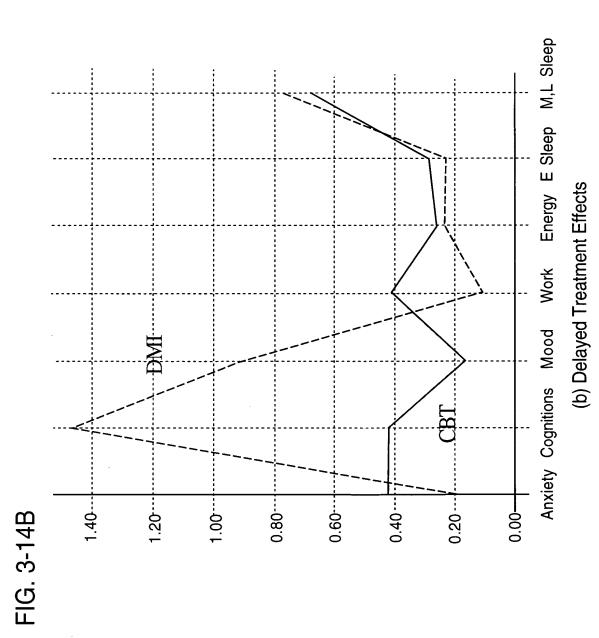
FIG. 3-12

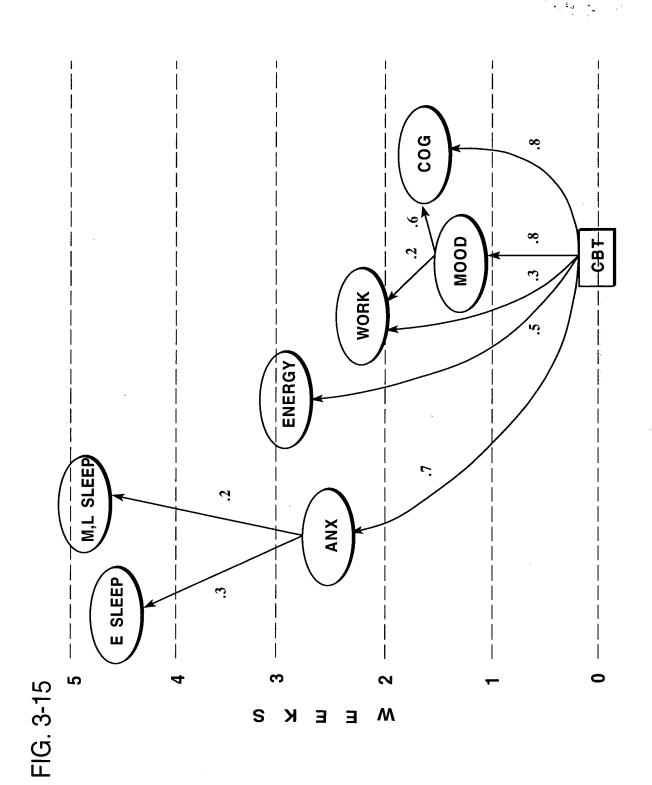






(a) Immediate Treatment Effects





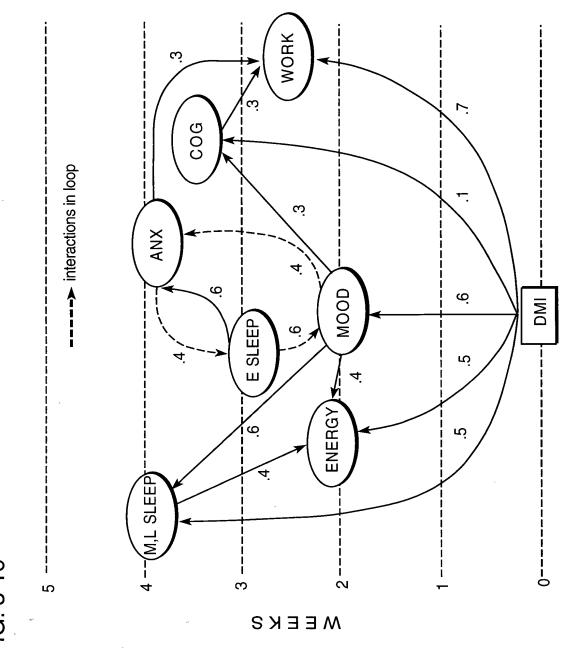
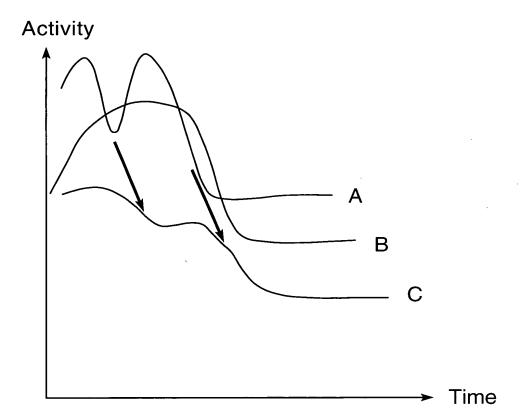
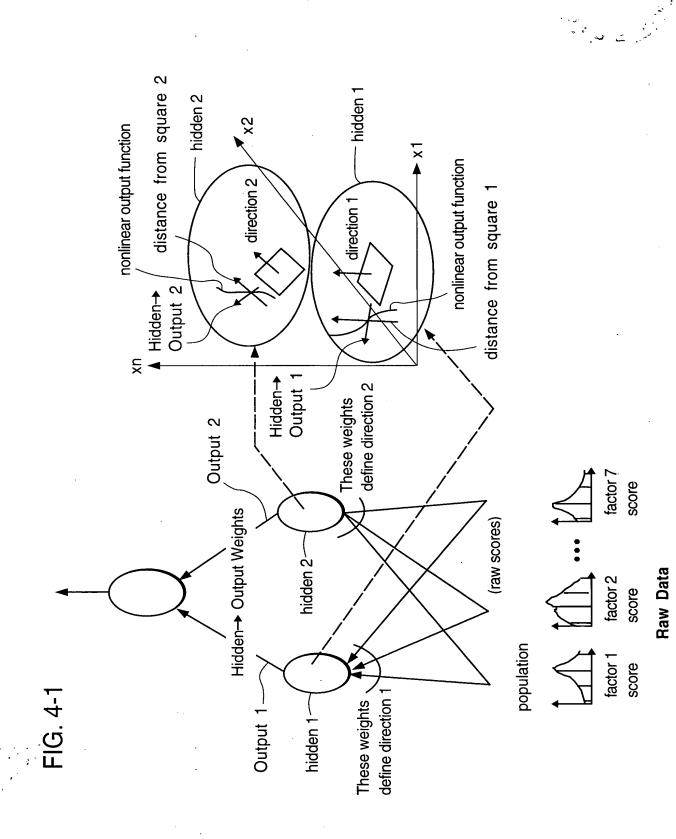


FIG. 3-16

FIG. 3-17





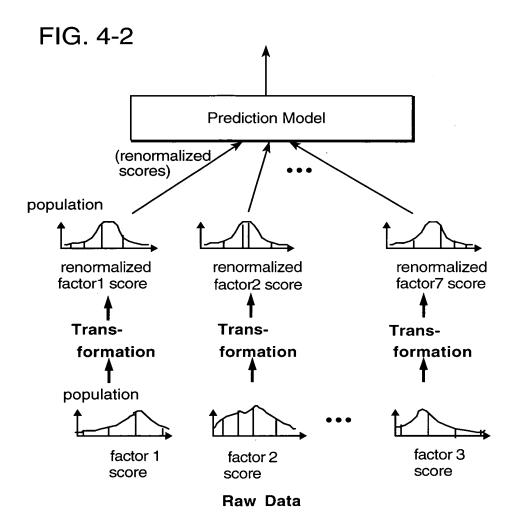


Table 4.1

Prediction of Outcome from Baseline Symptoms														
Symptom	Treatment													
HDRS Item	Other		Tricyclic							MAOI		Psycho- therapy		ECT
		Ami	Nor	IMI	DMI	Clo	Lev	Мар	Phe	Tran	Flu	IPT	CBT	ECT
Severity	5, <u>9</u> _	<u>10-</u>		<u>10-</u> ,11 <u>,16</u> + <u>,17+</u>	1,8	8,13	<u>ა</u>	<u>3–,6+</u>	<u>17+</u>		1	<u>16+</u>	7	<u>14-</u>
Depressed Mood	2	<u>10-,</u> 15	4	<u>10-,</u> 11	1,8	8			4	<u>18+</u>	1			<u>14-</u>
Feelings of Guilt		15		11	1,8	8				18	1			14
Suicide	5	15		11	1,8	8				18	1			14
Insomnia: early	2	15	4	11	1,8	8			12,4	18	1			14
Insomnia: middle	2	<u>15-</u>	4	11	1,8	8			12,4	<u>18-</u>	1			14
Insomnia: late	2	15	4	11 <u>,12+</u>	1,8	8			4	<u>18–</u>	1		•	14
Work and Interests		15	4	11,12	1,8	8			11	18	1			14-
Retardation	2	10, 15	4	10,11 <u>,12+</u>	1,8	8			4	<u>18+</u>	1			18
Agitation	2	10, 15		10,11,12	1,8	8			12,4	18	1			<u>14-</u>
Anxiety : somatic	2	10,15	4	10, 11	1,8	8			4	18	1			
Anxiety : psychic	2	10,15	4	10, 11	1,8	8			4	18	1			
Somatic: gastrointestinal		<u>15–</u>		11	1,8	8			,	18	1			<u>14-</u>
Somatic: general		10, 15	4	10, 11	1,8	8			4	18	1			
Genital symptoms		15		11, 12	1,8	8			11	18	1			14
Hypochondriasis		<u>15–</u>	4	11	1,8	8			4	18	1			14
Loss of Weight (or change)	2	15	4	11, 12	1,8	8			12,4	<u>18+</u>	1			14
Insight		<u>15+</u>		11	1,8	8				18	1			
Diurnal variation		15	4	11, 12	1,8	8			12,16	18	1			14
Depersonaliztion and derealization		15		11	1,8	8				18	1			
Paranoid symptoms	2	15		11	1,8	8				18	1			
Obsessive and compulsive	2	15		11	1,8	8				18	1			

Table 4.2

- 1. Bowden, C., Schatzberg, A., Rosenbaum, A., Contreras, S., Samson, J., & Dessain, E. (1993). Fluoxetine and desipramine in major depressive disorder. Journal of Clinical Psychopharmacology, 13, 305-311.
- 2. Carney, M., Reynolds, E., & Sheffield, B. (1986). Prediction of outcome in depressive illnesses by the Newcastle diagnosis scale: Its relationship to with the unipolar/bipolar and DSM-III systems. British Journal of Psychiatry.
- 3. Filip, V., Hoschl, C., Karen, P., Seifertova, D., Bornova, L., Praskova, H., & Prasko, J. (1993). Predicting therapeutic results with levoprotiline and maprotiline in major depression: The role of the outcome criteria. British Journal of Psychiatry, 163, 35-38.
- 4. Georgotas, A. & McCue, R. E., Cooper, T., Chang, I., Mir, P., & Welkowitz, J. (1987). Clinical Predictors of Response to Antidepressants in Elderly Patients. Biological Psychiatry, 22, 733-740.
- 5. Hinrichsen, G. A. & Hernandez, N. A. (1993). Factors associated with recovery from and relapse into major depressive disorder in the elderly. American Journal of Psychiatry, 150, 1820-18 25.
- 6. Hoencamp, E., Haffmans, P. M. J., Duivenwoorden, H., knegtering, H., & Dijken, W. A. (1994). Predictors of (non-)response in depressed outpatients treated with a three-phase sequential mediation strategy. Journal of Affective Disorders, 31, 235-246.
- 7. Johnson, S. L., Monroe, S., Simons, A., & Thase, M. E. (1994). Clinical characteristics associated with interpersonal depression: symptoms, course, and treatment response. Journal of Affective Disorders, 31, 97-109.
- 8. Joyce, P. R., Mulder, R. T., & Cloninger, C. R. (1994). Temperament predicts clomipramine and desipramine response in major depression. Journal of Affective Disorders, 30, 35-46.
- 9. Katon, W., Lin, E., Von Korff, M., Bush, T., Walker, E., Simon, G., & Robinson, P. (1994). The predictors of depression in primary care. Journal of Affective Disorders, 31, 81-90.
- 10. Katz, M., Koslow, S., Maas, J., Frazer, A., Bowden, C., Casper, R., Croughan, J., Kocsis, J., & Redmond Jr., E. (1987). The timing, specificity, and clinical predictors of tricyclic drug effects in depression. Psychological Medicine, 17, 297-309.
- 11. Kocsis, J. H., Mason, B. J., Frances, A. J., Sweeney, J., Mann, J. J., & Marin, D. (1989). Prediction of response of chronic depression to imipramine. Journal of Affective Disorders, 17, 225-260.
- 12. McGrath, P. J., Stewart, J. W., Harrison, W. M., Ocepek-Welikson, K., Rabkin, J. G., Nunes, E. N., Wagner, S. G., Tricamo, E., Quitkin, F. M., & Klein, D. F. (1992). Predictive value of symptoms of atypical depression for differential treatment outcome. Journal of Clinical Psycho pharmacology, 12, 197-202.
- 13. Nagayama, H., Nagano, K., Ikezaki, A., & Tashiro, T. (1991). Prediction of efficacy of antidepressant by 1-week test therapy in depression. Journal of Affective Disorders, 23, 213-216.
- 14. Pande, A., Krugler, T., Haskett, R., Greden, J., & Grunhaus, L. (1988). Predictors of response to electroconvulsive therapy in major depressive disorder. Biological Psychiatry, 24, 91-93.
- 15. Sauer, H., Kick, H., Minne, H. W., & Schneider, B. (1986). Prediction of the amitriptyline response: Psychopathology versus neuroendocrinology. International Clinical Psychopharmacology, 1, 284-295.
- 16. Sotsky, S. M., Glass, D. R., Shea, T. M., Pilkonis, P. A., Collins, J. F., Elkin, I., Watkins, J. T., Imber, S. D., Leber, W. R., Moyer, J., & Oliveri, M. E. (1991). Patient predictors of response to psychotherapy and pharmacotherapy: Findings in the NIMH treatment of depression collaborative research program. American Journal of Psychiatry, 148, 997-1008.
- 17. Vallejo, J., Gasto, C., Catalan, R., Bulbena, A., & Menchon, J. (1991). Predictors of antidepressant treatment outcome in melancholia: psychosocial, clinical, and biological indicators. Journal of Affective Disorders, 21, 151-162.
- 18. White, K. & White, J. (1986). Tranylcypromine: Patterns and predictors of response. Journal of Clinical Psychiatry, 47, 380-382.